



Training Course Outline

ITU and National Institute of Telecommunications

Title	QoS Technologies and Regulation for Fixed and Mobile
Modality	Online instructor-led
Dates	26 September – 3 October 2022
Duration	8 days
Registration deadline	26 September 2022
Training fees	USD 150
Description	<p>This course will focus on technical, business and regulatory aspects of QoS for Fixed and Mobile Networks. It includes QoS (Quality of Service) and QoE (Quality of Experience) fundamentals by ITU, as well as traffic and QoS management in Internet and IP networks. Further, it includes QoS for fixed ultra-broadband access, including QoS solutions in metallic and optical networks, carrier grade Ethernet QoS, as well as end-to-end QoS. The course also covers QoS for mobile ultra-broadband access, including 4G and 5G mobile technologies and their QoS capabilities and approaches. Further, it covers QoS-enabled services provisioning, including QoS and QoE for VoIP, video and IPTV services, as well as QoS for Internet OTT/data services. The course includes interconnection and its QoS aspects, generic and specific QoS parameters, KPIs (Key Performance Indicators) and their measurements, as well as network neutrality approach for OTT/data services and its regulation. The QoS constantly increases in its importance with the digitization and innovation of various critical services, so the course includes QoS regulatory framework based on technical, business/economic and regulatory principles of QoS for services over fixed and mobile networks.</p>
Course code	22OI27810EUR-E

1. LEARNING OBJECTIVES

This course will focus on technical, business and regulatory aspects of QoS for Fixed and Mobile Networks. It includes QoS (Quality of Service) and QoE (Quality of Experience) fundamentals by ITU, as well as traffic and QoS management in Internet and IP networks. Further, it includes QoS for fixed ultra-broadband access, including QoS solutions in metallic and optical networks, carrier grade Ethernet QoS, as well as end-to-end QoS. The course also covers QoS for mobile ultra-broadband access, including 4G and 5G mobile technologies and their QoS capabilities and approaches. Further, it covers QoS-enabled services provisioning, including QoS and QoE for VoIP, video and IPTV services, as well as QoS for Internet OTT/data services. The course includes interconnection and its QoS aspects, generic and specific QoS parameters, KPIs (Key Performance Indicators) and their measurements, as well as network neutrality approach for OTT/data services and its regulation. The QoS constantly increases in its importance with the digitization and innovation of various critical services, so the course includes QoS regulatory framework based on technical, business/economic and regulatory principles of QoS for services over fixed and mobile networks.

2. LEARNING OUTCOMES

At the end of the training, the participant should have gained an understanding of the key aspects of:

- QoS and QoE fundamentals by ITU
- Traffic and QoS management
- QoS for fixed ultra-broadband
- QoS for mobile ultra-broadband
- QoS and QoE for VoIP and IPTV
- QoS for Internet data services
- Interconnection and QoS
- QoS parameters, KPIs and measurements
- Network neutrality regulation
- QoS regulatory framework

3. TARGET POPULATION

This course is targeted at managers, engineers and employees from regulators, government organisations, telecommunication companies and academia, who are interested in understanding, implementation and regulation of QoS for Fixed and Mobile networks, including technologies, standardization, and regulation. Other institutions and individuals that are dedicated in building their capacity related to QoS Technologies and Regulation for Fixed and Mobile Networks are also welcome to participate.

4. ENTRY REQUIREMENTS

No prior knowledge or qualification is required to register for this course, considering the given target population.

5. TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Prof. Toni Janevski	tonij@feit.ukim.edu.mk

6. TRAINING COURSE CONTENTS

There are in total eight days, from which first 5 days (26 – 30 September) there will be given recorded video lectures, 2 per day, five days in total and that gives the total of 10 video lectures in this course. The lectures are on the following subjects:

Lecture	Subject
Lecture 1	QoS and QoE fundamentals by ITU
Lecture 2	Traffic and QoS management
Lecture 3	QoS for fixed ultra-broadband
Lecture 4	QoS for mobile ultra-broadband
Lecture 5	QoS and QoE for VoIP and IPTV
Lecture 6	QoS for Internet data services
Lecture 7	Interconnection and QoS
Lecture 8	QoS parameters, KPIs and measurements
Lecture 9	Network neutrality regulation
Lecture 10	QoS regulatory framework

7. TRAINING COURSE SCHEDULE

Days	Topic	Exercises and interactions
Day 1	Lecture 1. QoS and QoE fundamentals by ITU Lecture 2. Traffic and QoS management	Watching and listening to video lectures 1 and 2. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
Day 2	Lecture 3. QoS for fixed ultra-broadband Lecture 4. QoS for mobile ultra-broadband	Watching and listening to video lectures 3 and 4. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.

Day 3	Lecture 5. QoS and QoE for VoIP and IPTV Lecture 6. QoS for Internet data services	Watching and listening to video lectures 5 and 6. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
Day 4	Lecture 7. Interconnection and QoS Lecture 8. QoS parameters, KPIs and measurements	Watching and listening to video lectures 7 and 8. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
Day 5	Lecture 9. Network neutrality regulation Lecture 10. QoS regulatory framework	Watching and listening to video lectures 9 and 10. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
Day 6-7	Consolidation of knowledge	Possibility to watch all video lectures one again with possibility to ask questions to the tutor.
Day 8	Final Quiz	Solving the Final Quiz.

8. METHODOLOGY (Didactic approach)

The course methodology will be as follows:

- Each day from 26 to 30 September 2022 there will be made available two recorded video lectures, which are recorded in the face-to-face ITU Centre of Excellence workshop organised by National Institute of Telecommunications in Poland. In total there are 10 video lectures during the course.
- Discussion forum will be organized based on discussion topics given on a daily basis, where students are highly encouraged to participate and interact with instructors and other students.
- Quiz test will be assigned on the last day of the course, 3 October 2022.
- All announcements for all events (lectures, quiz and forum) will be given in a timely manner (prior to the event) by the course tutor.

9. EVALUATION AND GRADING

On the last day of the course a quiz test will be assigned. It will consist of 20 questions (multiple choice) which should be solved in a time frame of 90 minutes, with at least 12 correct answers (60%).

The course evaluation for obtaining the certificate at the end is based primarily on the results from the Quiz, however, replies to the raised discussion topics may also be considered in the evaluation process.

10. TRAINING COURSE COORDINATION

Course coordinator: Name: Sylwester Laskowski Email address: S.Laskowski@il-pib.pl	ITU coordinator: Name: Jaroslaw Ponder Email address: eurregion@itu.int
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